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50X1-HUM

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SOURCE Radio, No 4, 1948; No 6, 1949.

SOVIET CRYSTAL SETS

[Figures referred to are appended.]

ONE-KNOB CRYSTAL SET

50X1-HUM

L. Tul'skiy
Radio, No 4, 1948, pp 48-51

The common methods of tuning a crystal set are by using variable condensers, variometers, or "metal." All three methods are relatively expensive and complicate the circuit unnecessarily. They can be replaced by either of the two following methods: (1) a multitap coil and corresponding rotary slide switch of simple construction; (2) a coil with a slide contact traveling along its length. This article concerns the second method, but with the addition of certain special features to offset obvious disadvantages, such as excessive wear on the slide and exposed portion of the coil wire.

In the variation proposed by the writer, the coil is wound on a flat rectangular form which is then bent into cylindrical shape. The "Q" of the coil varies from 30-40. The slide is of special design consisting of a rotating arm (of the rheostat type), the end of which presses on a "floating" flexible metallic washer. As the arm is rotated by the tuning knob on the faceplate, the washer makes contact with successive points on the exposed wire at the top of the coil. Thus, the slide arm does not come into direct contact with the coil wire and the coil wire is not likely to wear down and short-circuit between turns.

The number of turns in the coil and the value of condenser C_1 (see Figure 1) are chosen so that the low end of the tuning band is about 2,000 m, which corresponds to the lowest frequency broadcast from Moscow radio stations. The tuning range should cover the medium and long wave lengths when an average-sized antenna (150-200 mmfd) is used. The value of the blocking condenser C_2 is not critical and in some cases may be eliminated altogether (depending on type of headphones used).

COMPETITION FOR BEST CRYSTAL SET DESIGN

K. I. Drozdov
Radio, No 4, 1948, pp 59-60

In 1947, the Central Council of Osoaviakhim (Society for the Promotion of Defense and of Aviation and Chemical Organizations of the USSR) held an all-union competition on crystal set design based on minimum use of means and materials available to rural radio amateurs. The competing radio clubs, circles, and individual amateurs submitted 30 crystal set models to the judges. The majority of the sets submitted did not comply with the basic condition of the competition, namely, minimum use of expensive components.

The following prizes were awarded: Designers Section of L'vov Radio Club (directed by Rodionov) was awarded the second prize for building a set designated as the "LR-1;" Spirov of the Leningrad Radio Club was awarded the third prize for designing the "Zarya" crystal set. In addition, incentive prizes were awarded to Moscow radio amateur M. A. Romanyuk for designing the "Kachestvo" set; members of Circle No 3 of Designers Section, L'vov Radio Club (directed by Demchenko) for designing the "Blizmets" set; Sitnikov and Dobromyslov, members of the Moscow Oblast Radio Club; Kulagin, member of the Ashkhabad Radio Club, for designing the "Ashkhabad" set; Mikhin, member of the Simferopol' Radio Club, for designing the "Radiominimum" set.

LR-1 Crystal Set

The LR-1 set, which received the highest prize awarded in the competition, features four individual tuned circuits each consisting of a pair of inductively coupled coils connected in series (see Figure 2). The circuits are tuned to four stations in the 200-2,000 m range by adjusting the relative positions of each pair of concentrically placed coils.

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CRYSTALS FOR CRYSTAL SETS

50X1-HUM

Radio, No 4, 1948, p 62

The table below lists basic information on the most commonly used crystals in crystal receivers.

Type of Crystal	Origin	Chemical Properties
Galena (galenite)	Mined as a mineral and synthetically produced	Lead sulfide PbS
Germanium	Mined	Chemical element Ge
Graphite	Mined and synthetically produced	Crystalline carbon C
Carborundum	Obtained by fusing coke and silica in a voltaic arc	Silicon carbide SiC
Molybdenite	Mineral: molybdenite	Sulfide MoS_2
Pyrite	Mineral: iron or sulfur pyrite	Sulfide FeS_2
Silicone	Prepared synthetically by calcinating sand with metallic magnesium, subsequent diffusion in molten zinc, and processing with hydrochloric acid	Crystalline silicon Si
Chalcopyrite	Copper pyrite, mined	$Cu_2S \cdot Fe_2S_2$
Zincite	Mineral, mined	Zinc oxide ZnO

The following table lists properties of various detector couples.

Type of Detector Couple	Sensitivity	Stability
Galena-graphite	Very high	Very low
Galena-copper	" "	" "
Galena-nickeline	" "	" "
Galena-steel	" "	" "
Germanium-steel	High	Very high
Graphite-steel	Low	" "
Carborundum-steel	Average	" "

Type of Detector Couple	Sensitivity	Stability
Carborundum-brass	Low	Very high
Carborundum-pyrite	"	" "
Molybdenum-silver	Average	" "
Molybdenum-copper	"	" "
Pyrite-copper	High	High
Pyrite-chalcopyrite	"	"
Silicone-copper	Very high	Very high
Silicone-steel	" "	" "
Silicone-chalcopyrite	" "	" "
Chalcopyrite-aluminum	High	" "
Chalcopyrite-copper	Very low	" "
Zincite-copper	High	Average
Zincite-chalcopyrite	Very high	High

DPKh CRYSTAL RECEIVER

Radio, No 6, 1949, p 59
S. Ignat'yev

The DPKh crystal set, produced by Raypromkombinat (Regional Industrial Combine of the Ministry of Local Industry) in the town of Khimki, gets its designations from the initials for "Detector Receiver Khimki."

The receiver is assembled in a box with a sloping front panel on which is mounted the tuning knob for the variometer. Jacks for two sets of headphones are provided at the bottom of the front panel while the antenna, ground, and crystal-detector jacks are mounted on a horizontal strip on top of the set.

The basic part of the set (see Figure 3) is the two-section coil L_1L_2 and the variometer L_3L_4. Rough tuning is achieved by selecting various available combinations of L_1L_2 and the fixed capacitors C_1 and C_2. Four wave bands may be tuned in, depending on the jack into which the antenna is plugged in: jack A_1 (1,300-2,000 m) -- C_1 is connected across full coil; jack A_2 (900-1,400 m) -- full coil in circuit but without C_1; jack A_3 (450-900 m) -- L_1 is out of the circuit and the antenna is connected directly to L_2; jack A_4 (250-500 m) -- antenna is connected in series with C_2. Variable tuning within each band is provided by the variometer L_3L_4. Coil data (number of turns) is as follows: L_1 - 90, L_2 - 30, L_3 (movable) - 74, L_4 - 30.

Some of the DPKh sets are produced with silicon detectors [crystals] with fixed points but with provision for selecting another point in event the crystal does not operate. Other sets are provided with special crystals which are permanently adjusted. [The author criticizes the jack band-switching arrangement which, as in the case of the "Komsomolets" receiver, sacrifices ease of tuning for circuit design reasons.]

[Figures follow]

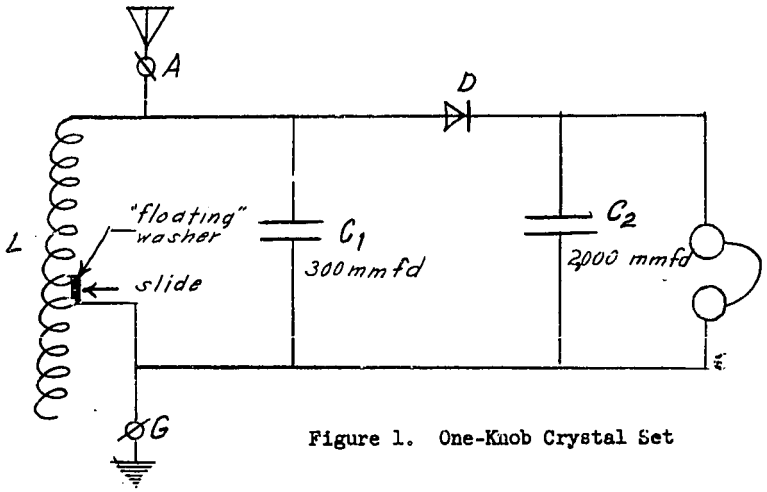

Figure 1. One-Knob Crystal Set

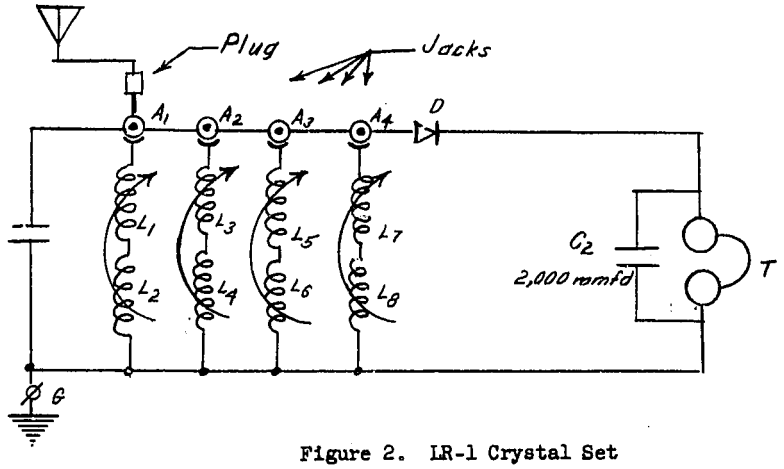

Figure 2. LR-1 Crystal Set

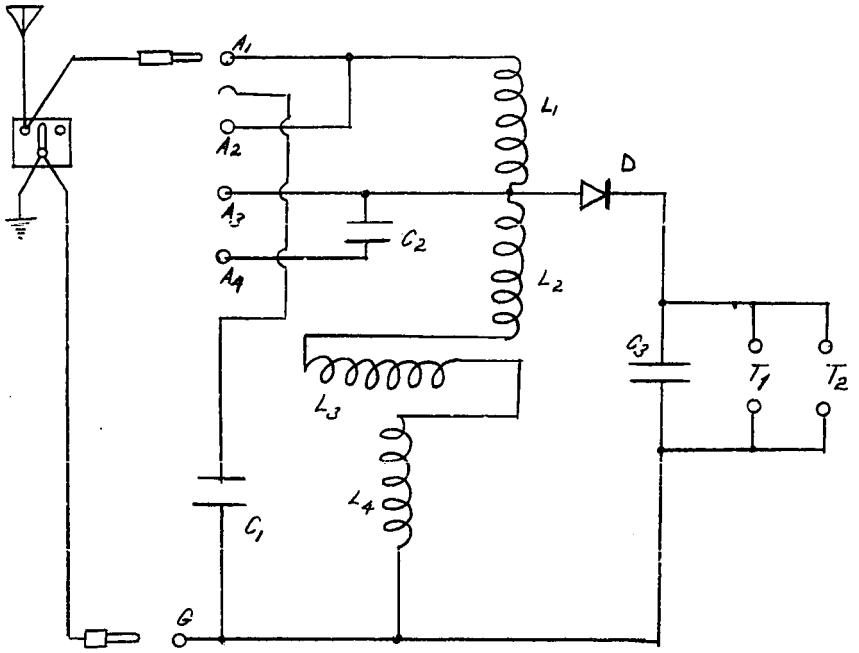

Figure 3. Schematic Diagram of DPKh Crystal Set

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